Academy Oral Histories Project

Interview with

Edward "Ted" Daeschler

Conducted by

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The Academy of Natural Sciences

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INTERVIEWEE: Edward “Ted” Daeschler

INTERVIEWERS: Athina Filipos, Pedro Raposo

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DAESCHLER: I’m Edward Daeschler—Ted Daeschler—and I’ve been at the Academy of Natural Sciences for 36 years and am recently retired. I finished as a curator of vertebrate zoology and a professor in the department of Biodiversity, Earth, and Environmental Science at Drexel University.

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FILIPOS: So Ted, how did you become interested in the natural sciences?

DAESCHLER: Wow. Family. I grew up in a family in New Jersey, but we spent a lot of time in the Pocono Mountains in Pennsylvania. I had a grandmother who was really a naturalist. In fact, in a different era, I bet she would have been a professional. She probably would have had a PhD and worked at a university in biology. But she just would gather the kids, and we'd learn flowers, and we’d learn birds and that kind of thing. So, it was a family enterprise, getting interested in natural history.

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FILIPOS: How did that relate into your education and what you pursued in high school and college?

DAESCHLER: I'd say probably not til college did I think about what the future might hold. I always enjoyed sciences. And when I went to college, I knew I would do something in the sciences. I thought it might be marine biology just because I didn't know much more. *Jacques Cousteau* was this television series that I always loved.

I went to Franklin and Marshall College out in Lancaster, Pennsylvania from 1977 to 1981, and it was during that time that I learned about geosciences, and ended up being a

geology major out there, which I felt gave me connections to the history of life on Earth. As I said, everything sort of connects, for me it was sort of life oriented, biological, although rocks were cool, too.

So, I got to do all of that. I was a geology major. So I think that my upbringing just gave me an appreciation and a confidence; I think students always pursue things that they kind of have a natural inclination to understand or have confidence doing. So that's where I landed, and I was very pleased with being a geology major.

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FILIPOS: Did that immediately lead into your interest in paleontology, or did that come later?

DAESCHLER: […] Paleontology is sort of a subdiscipline. Probably my favorite professor at Franklin and Marshall College, […] Roger Thomas, he taught sort of the history of the earth, historical geology, as well as paleontology out there. And he was my favorite professor. He was a really hard professor. An average score on one of his tests was like 50 out of 100, but he marked on a curve, so it was fine.

I graduated and thought, what do I want to do next? I took some of these graduate placement exams and did really well in the history of life. I guess Roger Thomas really connected with me and I with him. And so, I said, "wow, it looks like I got an aptitude for paleontology."

And I took a year and did some traveling and some things, but then decided I'm going to go to graduate school and study paleontology. So, I went all the way out to California, UC Berkeley, and did a master's degree in paleontology before starting here at the Academy.

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FILIPOS: What led you back here to the Academy?

DAESCHLER: [I was a] New Jersey kid, knew about the Academy. I knew some people who worked here, probably my parents' generation, but I knew of the place. As I said, I also spent time in the Pocono Mountains. It's sort of a triangle between the Pocono Mountains

and Philadelphia and where I lived in northern New Jersey. And when I started looking for a job, luckily, you know, contacts, network, as we would call it these days.

I heard about this one as a collections manager here at the Academy and applied. I kinda thought I would fit in pretty well. I can describe what my first job was in more detail. But it worked out really well. I was really pleased to get the position, and I've been able to parlay that position starting as a collections manager. I went back to school, got a PhD, moved through various positions through time, and now just retired as a full curator here and a professor at Drexel.

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FILIPOS: As you mentioned, you've been here for a very long time. What has been so important that has kept you here for so long? […] You've really been here for a very long time.

DAESCHLER: It was 36 years of employment. And now, they're not going to be able to get me out the door. [laughter] I come in now in retirement even at least a day a week, and I'm going to do some expeditionary work and that sort of thing. I'm sorry, your question was?

FILIPOS: What has kept you here for so long?

DAESCHLER: Well, love the Philadelphia area, raised a family, you know, that was all in the process. I'm not a terribly ambitious person. I'm not looking for, like, a better position somewhere else. That sort of thing. I may not be qualified for a lot of different positions. I'm glad to stay in this museum world, and grow it here at the Academy of Natural Sciences. And that's really what happened.

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FILIPOS: During your time here, did you have any mentors or role models? Either within the Academy, or general life?

DAESCHLER: I'd say both. First of all, here at the Academy, when I started, there was the president of the Academy, was Doctor Keith Thompson, Keith Stewart Thompson, and he

started the same year I did, which was 1987. And Keith had been a professor at Yale University, and he was a paleontologist. And his presidency at the Academy was sort of him saying goodbye to being a research paleontologist and [saying], "I'm going to be a museum president," which, you know, takes away those active research programs that you might have going on. And he had done work, actually, right here in Pennsylvania, as well as many other places. But he had worked in this period called the Devonian period, time frame. And I got to know Keith and kind of at the same time got to know people over at the University of Pennsylvania soon after I started here, so this would have been the early 90s.

And in '92 I started a PhD at University of Pennsylvania with a person I'm still collegial with, and that's Neil Shubin. He's now at University of Chicago. But anyway, Keith's impact, Keith Thompson's impact, connections to Penn and Shubin all kind of converged on "Wow, I'm going to study Devonian fishes and start right here in Pennsylvania".

Now it's grown. The research program now takes me to different places, as well as continuing to work in Pennsylvania. So Keith was a key early mentor for me, I would say. Otherwise, you know who was just a wonderful person, and I've seen a lot of different presidents in 36 years of the museum, but one of the more recent ones was George Gephardt. I felt like George and I were just kind of the same sort of person. He was a people person. He could do the administrative stuff, but it was people that he loved, he was so social and all the rest.

And he was only president for 5 or 6 years and then retired, it was sort of like a thing he wanted to do at the end of his career in business. But George was a great role model in terms of how to show people that you appreciate what they do, how to keep in touch with the group, be a leader by caring, not being a leader by being a tough guy sort of thing. So later in my career, I feel like George was the model that I learned a lot from.

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FILIPOS: You mentioned a little bit earlier traveling for work and going on expeditions. How did you first get involved in going on those expeditions?

DAESCHLER: It's not quite an expedition, but I started by getting in my old Volvo and going up to road cuts here in North Central Pennsylvania, so about 3 or 4 hour drive from Philadelphia. It's an area where there were rocks exposed along highways and secondary roads, all from this Devonian time period, which I had decided would be my dissertation topic, sort of the Devonian of Pennsylvania. Keith Thompson had found things there. People in the 1950s had found things. There was even a history going back to the late 1800s with

building railroad cuts across Pennsylvania and people finding Devonian fossils. But no real coordinated effort, it was sort of hit or miss people finding things, so I really dedicated [myself] to working hard in Pennsylvania and was very lucky that the Highway Department had been building some road cuts that we were the first people to really be able to explore. All you gotta do is move a lot of rock, and if there's fossils in those rocks, you know, we can find them. So different highway building projects benefited the work through the 1990s into the 2000s.

So that's how I got started, Pennsylvania. We even wrote research grants to do Pennsylvania. And then Shubin, Neil Shubin and I got this idea, like, where else is there Devonian age rock where we'd find a different diversity of forms than we were seeing here in Pennsylvania, maybe slightly older in time because we were looking at sort of the evolutionary changes, and we wanted to see some more primitive forms that were part of these evolutionary changes. I'm talking in terms of, like, 30 million years of time, and we're in that time frame.

So, we discovered that this area way up in the Canadian Arctic—it's now the Nunavut territory—had rocks of the right age, they were formed in stream deposits from the Devonian period streams, and they were pretty well exposed.

You didn't need highway cuts because nothing grows up there. We're like 600 miles above the Arctic Circle on Ellesmere Island. [We] started that in 1999 and did a series of expeditions, '99, 2000, 2002, 2004, 2006, 2008, 2011, 2013, and now 2024 if all goes well. […] That area became a wonderful place for us, and we're really the first people to do expeditions there to look for Devonian fossils.

The only other things that had been found was a Norwegian expedition in 1900 had collected a few small pieces of Devonian fish. I actually went to Oslo to look at them in a museum. You could hold them all in your hand. And it was nothing too scientific, but it showed us there would be fossils there.

Long story short, those Nunavut expeditions, as we called it, have been very successful. And then the last place we've done expeditionary work, taking off from the Nunavut work, was in 2016 into 2017 and then again in 2018 into 2019, [was] Antarctica, where there is Devonian rock formed in stream systems in that Late Devonian window of time that we're interested in, but a very understudied part of the world.

So we did two expeditions. Again, Neil Shubin and I wrote [a] National Science Foundation proposal to do this, and were funded. So two expeditions down there, and those are the harshest of the expeditions. […] It would take about six weeks of time to travel down, get trained, go out into the field for a month, come back, pack up, clean, take care of things, and then get all the way home.

Thank goodness my family was always very understanding of my interest in expeditionary work. […] To me, some of the most exciting aspects of my job are exploration, collecting, curating into a museum, and then beginning the process of studying these things or knowing that four generations from now people will be studying these things. […] Everything kind of centers on collections for me.

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FILIPOS: With your interest in collections and curation, were you involved in the gallery we have right now of *Tiktaalik Roseae* in the Devonian Period?

DAESCHLER: Very good. I'm glad you got to see that. Yes, 100%. In fact, I suggested the idea we do something like that. That gallery, the *Life onto Land:* […] *The Devonian* is in some ways a synopsis of what our research interests have been all these years, not only these different places; geographically, we're seeing the diversity of things in the late Devonian, but also the environmental crucible, whether it was nearshore, brackish, saltwater kinds of settings, swamps up into streams or the first forests on Earth, which were something that were starting to develop in the Devonian period. Though connecting the diversity of life to the diversifying ecosystems at the time is something that we really like to build on and continue to work toward.

So yes, I'm very involved in that with my colleague of many years here, Dr. Jason Downs. We work closely with our exhibits group on what should be in the exhibit, not only in specimens but also content in general. That was very fun and really rewarding to be able to see that stuff [on display]. Most museums are interested in dinosaurs and this kind of stuff, but we've got a beautiful display on lobe finned fishes and the origin of limbed animals. So, kind of fun.

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FILIPOS: As far as expeditions go, did you have a favorite place or experience or discovery?

DAESCHLER: Yeah. You know, we all should have a happy place, like when you can't sleep at night or [you're] worrying about something else. Think about your happy place. There is a valley on Ellesmere Island where we spent parts of like four summers. We located a beautiful place to set up our base camp where you [can] walk nearby and drink the water

out of the stream and you see it melting from a glacier upstream, and it's the site where about three quarters of a mile [away] is where *Tiktaalik roseae* was from.

We found *Tiktaalik roseae* starting in the year 2000. We found really good specimens of it in 2002 at that site. We went back in 2004 and found even better specimens of it, and then started to publish on that animal in 2006, and have had a series of publications. So that place, I call it the Fram Valley. The valley doesn't have a name, but the rock formation there is called the Fram Formation. That's one of my happy places and that's probably my favorite spot. Now, we're going back this summer, but we won't go to that spot. You know, we've kind of been there, done that. We could dig deeper on the same layer, but [...] we won't find new things. We're going to go to, geographically, about 50 miles away, where the ecosystems may have been slightly different, [with] similar age rock. We might find more of the same animals that we were getting at that site—sites—but we might find new and different things. That's the exciting aspect of always kinda looking for what's next. Not just doing the same thing. Although I would love to sleep on the ground of our camp there. It's a wonderful spot, really is.

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FILIPOS: Talking about your Devonian discoveries and things like that, how do you see your contributions at the Academy and within the wider scientific community?

DAESCHLER: Great, great. I feel really good about what we've been able to do with the Academy and for the Academy's scientific reputation through time. Vertebrate paleontology really has a birthplace here at the Academy of Natural Sciences, vertebrate paleo in North America, I should say. Our collections contain some of those very, very earliest objects that people were looking at and asking scientific questions of, the collections of Thomas Jefferson, for example.

[...] Also things in the early 1800s, we have those collections and some of the people just asking very basic questions about the history of the earth and the history of life on earth here at the Academy, and probably it was in the 1840s, 50s, 60s, 70s. Joseph Leidy [is] my hero. Just an amazingly productive, accurate, careful scientist, doing what we would think mostly of as comparative anatomy.

It's comparative skeletal anatomy. So, "Here's the jaw that was found out in South Dakota." Joseph Leidy would look at it and say, it seems to be pig related, but it's not exactly a pig, it has some other features that make it unique, let's call it these things and let's find

more. So building collections and material being sent to him from all over, particularly North America.

I guess I got a digression there. We could talk about the history of paleontology at the Academy, but that kind of ended around 1900. Edward Drinker Cope, another famous person, passed away. The Academy filled other positions, kept [the] collection, which degraded [...] entropy takes over and chaos starts to come into any collection that isn't managed and maintained and used. So between Cope around 1900 and my hiring as collections manager, but more importantly, curator in 1998–so almost 100 years–there was a gap with no research in paleo. So, I feel like I've been able to—I should say, no research in vertebrate paleontology—I feel like I've been able to reestablish the Academy as an institution known for vertebrate paleontology.

The research side is all on this Devonian time frame, but our collection of everything else is in good shape now. We've done a lot of work with housing and curation and databasing and those sorts of things. So we contribute to the international teamwork, so that a researcher from China can come and know exactly what we have, could get a digital image, maybe get a 3D scan, any number of things, or come visit and use our material.

We absolutely now are part of these international communities of science. Whereas if the Academy had decided 35 years ago, "Yeah, we're not going to really do vert paleo," that collection would still be kind of mothballed. It just shows the importance of an active collection and curation, research, access, all those things.

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FILIPOS: How do you see history and science intersect or work together in your work or at the Academy in general?

DAESCHLER: Oh, it's a fascinating aspect of how science proceeds. We absolutely need to understand the context of scientific research. If we're talking about Joseph Leidy, for example, the American West was opening up. There [were] interesting activities there feeding into things back here in Philadelphia. Philadelphia was a Quaker City, and how did that impact Leidy's science. The Civil War kicked in, Leidy went from studying medicine into more systematic type stuff, the kinds of things I was mentioning earlier that he did. So you can't separate the science going on from the history [of] that time frame.

This is particularly interesting, and I'm not very studied in it. But how do we deal with...you know, at times science was done [with] questionable [...] methods or ethics involved [...]. But the historical context are those methods and those ethical decisions. I find

that very interesting, and realizing even our own work today they could look back at in 200 years and say, what was the context for that work? In whatever it might have been, ethical decisions we've had to make.

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FILIPOS: Can you tell us about a particular project at the Academy that you've been most passionate about?

DAESCHLER: What have I been most passionate about here at the Academy? I've done a little bit of everything, which is really fun. Here's one that's kind of, maybe, unexpected. My job as collections manager when I started in '87 was to work with the vertebrate fossil group, vertebrate fossil collection, the mammalogy collection–which were modern mammals, skeletal and skin specimens–and the herpetology collection, which are modern reptiles and amphibians mostly stored in alcohol in jars.

And that grouping is somewhat artificial, like most museums might have a separate department for each of those. But here at the Academy, they were all collections that didn't have a […] research curator at that period of time. So they had been grouped into what's called vertebrate zoology, also called vertebrate biology. We've never really settled on one, we get them both. So that's opposed to things like ornithology is its own department, entomology is its own department, ichthyology is its own department. Those three were my job, and we definitely have made big improvements in databasing, housing, basic care of all those things and making sure they're accessible. The one that was added to my plate, partly because we raised our hand and said, "well, we will do this," is our mineral collection here at the Academy. Talk about something that hadn't been accessible, hadn't really been appreciated, had no research going on since [...] there were some people helping the collection along in the 60s and 70s, maybe into the 80s, but no research.

Anyway, our mineral collection here at the Academy. And then there was a period of time, and this has been most of the history while I've been here, is financial woes of the Academy. I always wondered, "when is this going to get better?" And it just never got better, [it's] permanent.

The Academy's board looked at this mineral collection as potentially […] worth something. We're not studying it, we're really not putting it on display. There's nothing we're doing with it, and it's got a monetary value. Let's explore deaccessioning and selling this collection. […] One of the rationales was, and we're not taking care of it. So we put up our hand and said, "we could take care of this."

My little group, myself, Fred Mollison, Ned Gilmore, two guys who I worked with in the department. Fred, fossil preparation, Ned, collections manager after I became curator. So we did. Part of the collection was sold, but part of it was kept. And the part that was kept, we got to get in there and rehouse, and re-catalog, and put it in archival materials, and get it perfectly organized so that […] now it's in good shape.

I wish we could display it. We've always had talks about that, and some day it obviously will go back out on display. But I'm really proud of the way that rehousing of the mineral collection—and it's particularly called the Vox Mineral collection—I'm glad I got to be part of that. It's very rewarding for me. I'm one of those people who loves to do a job like that. Stand back and say, look at this. Open a cabinet. Look at this, look at the organization. That sort of thing just really is satisfying for me. I like that aspect of collections work in general.

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FILIPOS: As far as feeling very rewarded after doing things like that, how does working at the Academy help you fulfill your career goals throughout your life?

DAESCHLER: Part of that might be—and maybe I've learned this while at the Academy—is you do like to think that there's a legacy, right? That what you're doing will remain. The beauty of it is I've gotten to write scientific papers that will exist now. 50 or 60 scientific papers will be there forever for people to learn from, for people to look at and say, "well, what were they thinking?" [laughter] You know, and build on it one way or another. That's a good legacy piece. The collections themselves are absolutely legacy pieces. We expect and hope that these will be here forever.

And that's the Academy's mission in large part, is keeping collections so that future generations have material to work on, ask new questions, review the material that was used to answer questions previously, but then to build again on that. Any one specimen has an infinite number of potential questions that it can help with. You build those and you know that they're there for the future.

So those sorts of things, and I would say in general the institution. I've had different roles here at the institution. I became a curator in 1998, assistant curator, and I've moved through the assistant, associate, and full curator ranks starting in '98. For part of that time, I also was vice president for the grouping of collections that we call the systematics group, or the Center for Systematic Biology and Evolution.

As vice president, I had that role of being part of the president's management group, representing collections and the research that's done [by] the curators to that group. […] I even got to be a liaison for the library and archives to that management group when there was a low ebb in the activity there.

I feel like even my work to help sustain the Academy through time, and make it a strong institution, is something that's rewarding because […] look what's happening. We've got this Drexel affiliation. Hopefully we'll build and be stronger, and hopefully what's at the Academy will teach people in the city, and give opportunities to people to do science, and [support] a love of science, and [give] a reason to support conservation and biodiversity. It goes from a paper or scientific specimen to the health of this institution as the rewards that I feel.

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FILIPOS: You mentioned the Academy in relation to Philadelphia. How have you seen the Academy interact with the city and the people of the city and the general public?

DAESCHLER: That's probably been pretty stable through the years, in that I feel like we have a demographic that I wish, we all wish, was a wider demographic, more people to introduce to the excitement of natural history. But I feel like we have this core demographic here in Philadelphia. Now, every first-rate, world-class city needs a natural history museum as far as I'm concerned. So, we help Philadelphia establish itself as a place for this kind of science, this kind of research, this kind of collaboration with other great cities and other great museums and so forth.

I know in the more recent years […] either [because of] Covid or me just being a little bit further in my career, I haven't been as much on the management side of things—but I know the Academy is trying to reach broader demographics here in the city, and that's fantastic. That's sort of a dream I guess, that I would hope happens, with the relationship between the Academy and Philadelphia.

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FILIPOS: As far as collaboration and relationships, can you tell us a little bit about what the affiliation with Drexel was like?

DAESCHLER: Sure, sure. I got to be on the ground floor of that, which was exciting. […] George Gephardt, I mentioned him a little bit earlier, [was] a fantastic president [starting] in 2010, […] [and] I was vice president for the systematics group [at the time]. He took us on a retreat, and we had a couple of days where the question was, the Academy is having a hard time being an independent natural history museum, doing all the things that a natural history museum does. We need a partner. That was where George came from. This is George's mindset...he had been in business, and when a business needed to do better or expand, it would find a partner, and we had the discussion at that retreat: should it be an academic partner, should it be a technology partner? We talked about Comcast somehow being partnered with the Academy. Honestly, that didn't have much action. But the academic partnership made a lot of sense.

We reviewed a little bit of the history of that. Apparently there had been connections with University of Pennsylvania in the past, informal connections. But one connection going back, none of us knew about, [was] around 1900, the Academy and Penn were going to merge at one point […] yeah, probably merge is an okay word for it.

I think Penn had come to the Academy and said, "do you want to be part of the University of Pennsylvania?" And the Academy said, "no thanks, we're doing good." Anyway, at this point: connections, networks, George Gephardt. I think earlier we mentioned that personal connections can play a big role in this sort of thing. George Gephardt and the president at Drexel, John Fry, who was pretty new at the time, had a personal connection. So they started talking, and then they empowered a few of us to start to talk with some faculty, and eventually the dean at Drexel. So we saw it build. Then we talked about, okay, what can we do? Well, we can all join the BEES [department], the Biodiversity, Earth and Environmental Science [department]. We made up that name, by the way.

We can use some Drexel faculty and all of the research group here at the Academy, [in] environmental science and systematic biology, could team up to create a department at Drexel, and we could teach, but also work at the museum. Obviously it's been a good partnership. It has meant a lot to me individually because it has introduced me to so many wonderful students, so many colleagues at the university who might not be directly involved with my research interests, but […] you love to feel like there's an academic environment that you're part of. Not that the Academy alone didn't have that, but this is a larger ecosystem of academics.

[…] I sort of stepped away when the push came to shove, when it came to [deciding if this is] a good financial plan. But I think it has been a good financial plan, and there's more resources now with the university. I think the past 11 or 12 years have been a successful experiment. There's some unforeseen consequences, there really are. Honestly,

I'm dealing with one right now, [which] is when someone retires in the university, sure they hire maybe in that department, but maybe they decide they're going to...in a department like the BEES department, maybe they need a molecular ecologist, not another vertebrate paleontologist. So that's what the university is saying now to fill my position. But the museum is saying, "no, we want another vertebrate paleontologist because we got this collection, and we got these public displays."

That kind of unforeseen friction in hiring is something that was unforeseen to George Gephardt and the rest of us, although I remember some sage folks who worked here at the Academy saying, "okay, we just have to be sure that [they're] not going to replace all of us with molecular biologists. We want to do collections-based research." And to some degree, yes, it's kind of happening, [but] no it isn't. Some of the new hires we've made, like [in] ornithology and invert paleo, have been good old collections-based people who love it. So, there's unforeseen stuff. But overall, I'd say it's been a successful experiment for sure. The contact with students, particularly. And getting students to work in the museum adds to the manpower here. Teaching a class and getting that enthusiasm and feeling like the students really enjoy it when we go out and look at these rocks or collect these fossils. [It] kind of re-energized my interest too. Unforeseen consequence: it takes a lot to be a professor also. It's like having 30 extra children for that period of time. Not that students are children, 30 extra people. And you're responsible […].

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FILIPOS: What other challenges and advancements have you experienced over your career at the Academy or seen the Academy experience?

DAESCHLER: One that comes to mind first is leadership. We've been through a lot, especially that top leadership position, president, CEO of a place like the Academy of Natural Sciences. It's so important. […] We've had a number of presidents who came in [and] 3 or 4 years later they left or were asked to leave. It's really hard to make progress if people are [only] there for 3 or 4 years.

You see how important that choice of a leader [is], which is very hard to know when you're doing the search. At some point it comes down to, "wow, good, we got the right person," and that's only proved through time, really […]. So, how important leadership is.

Other challenges…I guess [are] from a technical perspective. But we've done a good job with this. […] I've lived through the digitization age. When I started, I was handwriting labels to put on specimens. My predecessor wasn't exactly in the position that I stepped

into as collections manager, but they were doing a database that was about as primitive as you could get in the age of computerization.

You laugh at it today, nothing could run what they did. I've lived through the challenges of keeping up with digitization**.** […] I wouldn't say we were at the forefront of things, but we certainly have kept up through time. I wish we had every specimen digitally imaged, for example, at least all the important ones, our type specimens or something.

We haven't done that, but we certainly have our records, our collections database of every single number, every single specimen for mammals, herps, minerals, vert paleo. All done. That was a fun and exciting and consequential challenge through this period of time. Sometimes I look back at it and I can't believe I was writing, I was not handwriting, but I was typing things when I started. It just shows how quickly things have moved in the last 35 or 40 years. It's really remarkable.

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FILIPOS: With how quickly things are moving, are there any advancements in digitization or things like that that you would like to see in the future for our collections and things like that?

DAESCHLER: Well, sure. I mentioned digital imaging. Wouldn't it be super if our most informative and most used material was digitally accessible? Those would probably be the type specimens. […] For any given species a type specimen is set aside, whether it's a mammal skull, skin**,** or a snake in a jar, or a fossil, whatever part we may have of it that is used for the description of that scientific name.

If we could not only surface scan but three dimensionally scan all those things, so that someone in India could get on a terminal and ask the question of, "what are the bones in the ear? What's the configuration of the bones in the ear?"

Fantastic, right? That's how we're going to make sure science can accelerate, and this useful information can be put out there. […] The other thing is the tools for querying those databases, even if they're the existing databases. Can I ask, from this location or this range of geographic space, what specimens were collected between 1850 and 1900 and by whom?

Pretty simple queries, but all the mapping programs and things like that, I think are only going to get better. And maybe AI will just allow us to ask questions that pull from our

databases and things. It could be incredible. […] I don't think we're finished yet with what the digital age will allow us to do.

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FILIPOS: Going back to the time period of the Drexel affiliation, that was going on at the same time that the Academy was celebrating the bicentennial. Can you tell us a little bit about that?

DAESCHLER: […] The bicentennial was obviously exciting, leading up to it energized us. It allowed us to look at our history and present some of that. The book that Bob Peck [and Patricia Stroud] did, *Glorious Enterprise*, was just something we all wanted to see at that time. We had the hundred […] or two hundred days where we put blurbs out on the web every day, some interesting fact. Dennis Murphy wrote most of those. We had an exhibit where each collection and environmental science were able to have a piece of this exhibit and show objects and tell a few stories. Obviously you're pretty proud of that too, right? I'm at an institution that's 200 years old. It's the oldest continually operating major institution like this in the New World. And there was some nice feedback, there was some nice press. It was a big deal, and it was fun for all of us to be able to participate. Now I look back at it and say, wow, this is just going to continue to build.

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RAPOSO: Can you share your thoughts, Ted, about how the field itself, your field in paleontology, has evolved since you got started in the field?

DAESCHLER: I think vertebrate paleontology has come a long way. I think it's more rigorous than it may have been when I started. Unfortunately, there's still this perception that a paleontologist just hunts a fossil, throws a name on it, and that's that, and always wants to find the newest or the biggest or the meanest or the scariest [laughter]. That's not the case at all. […] I study a slice of time and a branch in the tree of life, and there's so much diversity to life and so many important branches through time. I think my branch is particularly important. The origin of limbed animals, and then the diversity in this Devonian period. But every step in the history, in the tree of life is going to be an important one.

But to answer the question, yes, the techniques to study and look at anatomy now [are] much more detailed. […] We also have much more comparative material, a bigger database to draw from, whether it's living animals that you want to compare to your fossil form or other fossil forms. All of that is more accessible than it was previously.

The rigor is particularly true for what we spend a lot of time on here at the Academy, not only in vert paleo, but in other parts of the systematics group, which is doing the phylogeny, which means the evolutionary history of groups of animals. This is what systematics means, […] instead of me being a specialist in lobe finned fish and early limbed animals and saying, "this is how I think things are related," which is what was going on in the 1950s and even into the 1960s.

Now we use a methodology that we call cladistics. It allows us to quantitatively build phylogenies that are repeatable. So I can give you my data on what the characteristics of these different animals are, [and] you theoretically could use my data to produce the same tree as I have, or you could modify and say, "well, I know a little bit more about the groups in here, I have additional specimens." You could build a slightly different matrix of data that would produce a tree that's probably similar, but may have some differences. In other words, it's not just my opinion of what is important, it's a more dispassionate view of how we get at evolutionary relationships, and more repeatable, which makes it science, which is better.

That's a really key part of, in my 36 years, the evolution of the field of vertebrate paleontology particularly. Plus, it was all men when I started. Now it's at least 50% women. More minorities are getting interested, although there's still room for plenty of improvement there. Internationally, many countries which you wouldn't have expected to be adding to the pool of vertebrate paleontologists are part of it now.

There's still too much emphasis on dinosaurs, but so be it. That's just one branch on that tree. It's an interesting branch. I teach dinosaurs, but there's a lot of, of course, other interesting stuff. The way I look at the tree of life, I study all these branches and branching points in time, and then we've got all the modern stuff that you're trying to tie back through those branches. So even studying modern forms is relevant to the way we look at paleontology.

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RAPOSO: Maybe one last question for this session, Ted, is…so you often mentioned collections and how important collections have been to your work. How do you see the place and role of the Academy as a steward of natural history collections in a broader panorama of natural history museums and collections?

DAESCHLER: Collections are really what I get the most reward from, I would say, and what I'm most proud of with the work. The role of the Academy [is] really a public trust to keep these collections, because as I tried to say, [if] a specimen is not used, [it's] put on a shelf to gather dust. [If] a specimen is used, [it's] published if it's relevant to a publication, put on a shelf until the next person comes in and says, "oh, I want to review what was part of that study, but I want to ask a different question."

So we need to preserve these things. It's a public trust that this generation or the next generations, ten generations down the line, [that] this material will be there to produce data to draw from. […] For example, one thing that's very time sensitive is, where do these organisms live?

You can look at the collections at the Academy and say, we have collections of these things from 1890 at this place. They're not there anymore. Where were they in the 1920s? Were they still there? Oh no, their range has moved through that 50 years or to the present. Or were they extirpated for one reason or another, not just shifting climates?

There's a lot of unique aspects of each and every one of the specimens. There's not just the object, but the data that goes with it. That's why data care is part of collections care as well. […] Not only the history side of it, who collected it? Why were they going there? How did they get there? Who funded them? [But also,] exactly where is that specimen from? What were the genetics of that specimen? That's incredible that we have this repository. It's just being slightly tapped of genetics, through time, of populations and more broadly. I really feel like collections are a public service that the Academy and other museums like it do.

George Gephardt was fond of saying, […] "We have a public trust, but we don't have public funding." Which is annoying, but the point is that we do need to keep this stuff and we need to do our best. I just hope that through time, and I feel like it's to some degree happening, that the general public [will have] a better understanding and appreciation of why we do keep collections and what the value is, because it really is immeasurably valuable, and totally non replaceable. If we were to discard everything we have, it's not like we could go collect another one, [even] with all the money in the world, because of the time and place and [everything] that we have behind these walls. Among […] institutions that keep collections, I don't know right now where we are, but we are certainly world class. We're top 10 to 20 in the world. That says something. That means a lot.

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RAPOSO: Before we close this session, would you like to add anything Ted?

DAESCHLER: […] The Academy is an interesting place to work. There's people who stay here for 40 years. There's people who stay here for 3 or 4 years and then move on, which is actually the way it should be, I think. Many of the people who do work in the systematics group tend to have some longevity here, because I think they get connected to their job and their collection, and then they get so specialized they can't get another job somewhere else without changing fields completely.

There's a lot of passion here for the work that people do. I'm really lucky to have worked with a small and great group of people in my vert paleo group here. Not my group, but our group. For years, he's retired now, Fred Mollison, our fossil preparator, came in as a volunteer. We hired him and kept him hired for 20 years doing the detailed work of taking the rock away from the bone, and then preserving the bone and helping us study it. Ned Gilmore, collections manager. For a while, we were Ned, Ted and Fred. That was our little group. And there was Ed Melnate, who worked in herpetology, [who] was sort of part of our group. So, Ned, Ted, Fred and Ed.

Now the group is kind of dissolved, but we all keep in touch with each other. So those people—and another key one I should mention is Jason Downes, who we sometimes called Jed just for fun—those people who I've gotten to work with, and it's been a pretty stable group through time, obviously are part of the joy of a job like this. Part of the reason to stay here and […] to be passionate about it is that you get to work with great people who share that passion.

That's it. I'm sure I can think of more, but I'm good.

RAPOSO: Thank you. Thank you very much.

DAESCHLER: Yeah.